ON SOME NEW TRILOBITES FROM BOWNING, N.S.W.

By John Mitchell.

Bronteus longispinifex, n. sp.

(Plate xvi. figs. 1 and 2.)

Head-shield semicircular as far as can be judged from the specimens obtained, much granulated, the granulations of varying sizes.

Glabella greatly dilated in front, axial and neck furrows distinct, the front lateral groove feeble, second one strongly marked, facial suture from the eye lobe to the outer margin about parallel with a line drawn longitudinally through the centre of the shield. No spine visible on the genal angle, but from the character of the pleuræ it is probable that it may bear one. The greatest transverse measurement of the glabella about equal to the length of the head. The eye is slightly pedunculated. Length of head-shield one and a-third times ($\frac{4}{3}$) that of the pygidium.

The thorax is the most remarkable feature of this species, the axis being very wide, moderately distinct and slightly arched; axial furrows visible and intensified by an increase of thickness at the base of each segment, and an opposing tubercle at the base of of each pleura; the segments have a decided curve forward; width at the fifth segment ·1354 inch ($\frac{13}{96}$ in.), and this is probably the greatest width. From the sixth the width gradually diminishes, and the last is only about half the width of the fifth and sixth segments. The side lobes are very narrow, the pleuræ being only about one-quarter as long as the axis is wide at its fifth and sixth segments. From each pleura projects a flat spine more than three times its own length; these curve backwards more and more until the last three are parallel or nearly so with the axis; along the centre of each is a row of fine punctations not visible to the unaided eye. The granulation of the thorax is not nearly so marked as that of the buckler and pygidium; but each pleura bears two conspicuous granules, one on each extremity, the one on the basal extremity helping as before stated to make the axial grooves more marked.

The pygidium is shorter than the cephalic shield, much granulated, and sub-semicircular; that is, if it be transversely sected so as just to remove the part bearing the rudimentary axis, the remainder forms a semicircle. Along the margin are several (6 are visible with a lens) concentric, or nearly concentric striæ, similar in character to those on the pygidium of *B. Partschi*, Barr. The ribs are thirteen in number, separated from each other by well-defined sutures. The medial rib is a little wider than the united width of the three adjoining ones on either side of it at their junction with the rudimentary axis, and about as wide as the other three together. The second from the medial rib is very narrow. The length of the medial rib equals about $\frac{7}{4}$ths that of the one (first) which runs by the side of the thorax. Each rib, except the medial one, is traversed longitudinally by a central ridge, and the medial one by two such ridges, one on each edge. Each of these carries a row of tubercles of larger size and more regularly placed than the others. In this feature the spines of the pleuræ of the thorax resemble the ribs of the pygidium. The number visible with a lens in each row on the spines is 5, and on most of the ribs of the pygidium about the same number. These tubercles are plainer on the cast than on the fossil. The medial rib terminates in a somewhat spear-shaped point, the shaft oblong. The line of articulation of the pygidium with the thorax is straight. The rudimentary axis may be ranked semicircular, rather convex, its axial furrow visible. The whole pygidium is slightly convex.

Dimensions—Head long $\frac{15}{96}$ in. (4 mm. nearly). Thorax: axis wide at 5th and 6th segments $\frac{13}{96}$ in. (3·385 mm.). Length of six segments attached to the pygidium equal to the width, and, as 5th and 6th segments are each about twice as wide as the last segment and wider than either of the posterior segments, it is probable that the four anterior and missing segments of my specimen would have a length equal to the six that are present, which would make the axis twice as long as wide. Pleuræ long $\frac{3}{96}$ths in. (·781 mm.). Length of spine $\frac{10}{96}$ths in. (2·6 mm.). Pygidium long $\frac{11}{96}$ths in. (2·86 mm. nearly), wide $\frac{14}{96}$ths in. (3·6 mm.). Rudimentary axis wide $\frac{5}{96}$ (about) or $\frac{1}{3}$ the total width of pygidium. Total length of specimen $\frac{49}{96}$ths in. (12.4 mm. nearly).

The subrudimentary character of the pleuræ of the thorax, their long spines, and the great proportionate width of the axis are the striking features of this species, and distinguish it from all I am acquainted with, and certainly from either of those yet recorded from Australia. The specimen here described, which is of immature growth, has six segments of the thorax with pygidium attached nearly perfect. The four front segments have been obliterated by the head which has been turned backwards upon them. Some heads which I have obtained have double the dimensions of this specimen, and would therefore belong to individuals more than 1 inch long.

The test of the thorax and pygidium of this species must have been of a delicate character, for though heads are numerous, it is rare to obtain even a fragment of these two parts.

This fossil occurs in the lower Trilobite Bed of the Bowning Series, associated with representatives of the genera *Acidaspis*, *Encrinurus*, *Proetus*, *Cromus*, *Harpes*, *&c.* Two of the associated species have been identified by F. Ratte, Esq., as *Acidaspis Verneuili (?)*, and *Proetus Ascanius (?)*, *vide* Proc. Linn. Soc. of N.S.W. 1886, pp. 1066-7. (1)

Locality.—Bowning. From a specimen in my collection.

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(1) When I submitted the fragments of *A. Verneuili*, which are here described by Mr. Ratte, I had not obtained a pygidium that beyond doubt belonged to the same species as the head and fragment of thorax here referred to; but since then I have obtained several pygidia attached to fragments of the thorax of this species; and they agree in character with the description given of the pygidium of *A. Verneuili* by Barrande. Hence the doubt which Mr. Ratte had on account of the absence of a pygidium, must I think, be set at rest; and Mr. Ratte's identification of *A. Verneuili* for the species, be confirmed.

CYPHASPIS BOWNINGENSIS, n. sp.

(Plate XVI. fig. 3.)

The specimen here described is nearly complete, and was obtained by me from the upper Trilobite Bed of the Bowning group.

Head-shield apparently semicircular, though as the specimen is slightly contorted, and one of the free cheeks is absent, that is not certain.

The glabella is pyriform, very convex, circumscribed lobe small, axial furrow distinct and deep in front; anterior portion of the facial suture directed outwards at an angle of about 30°, the posterior portion cuts the side lobes in about the middle. The eye is crescentic. The genal angles terminate in spines about $\frac{3}{32}$ in. long (1·6 mm. nearly); limb strongly curved downwards in front, and the edge upwards.

The thorax is about as wide as long, the axis very prominent, with 11 or 12 segments; its greatest width $\frac{3}{32}$ in. (1·6 mm. nearly) across the first three segments, from thence it gradually diminishes to about one-half of that width at its articulation with the axis of the tail. The side lobes as wide, or a little more, as the axis, strongly curved at the sides. Medial suture of pleuræ visible, and not extending exactly to the ends. Axis of tail very prominent, first two segments well-defined; first two pleuræ of side lobes similarly well-defined, and the sulcus visible. Contour of tail semicircular or triangular, and twice as wide as long. No granulation distinguishable, but this may arise from imperfect preservation.

Dimensions—Head $\frac{16}{96}$ in. (4·233 mm.) long; glabella long $\frac{10}{96}$ in. (2·91 mm.); thorax long $\frac{25}{96}$ in. (6·6 mm.); tail long $\frac{7}{96}$ in. (1·83 mm.). Total length $\frac{1}{2}$ in. (12·7 mm.).

This species is found associated with two species of *Acidaspis*, one of which bears a resemblance to *A. Leonhardi*; two species of *Proetus*; two species of *Phacops*, like *P. fecundus* and *P. caudatus*; several species of *Orthoceras*; and some lamellibranchs and gasteropods not yet made out.

Locality.—Bowning. From a specimen in my collection.

Proetus Bowningensis, n. sp.

(Plate xvi. figs. 4-6.)

Head evidently semicircular. Glabella large, semi-conoid and not distinctly marked off by the axial grooves, the lateral furrows feebly present, neck furrow shallow and wide, width between the eye lobes nearly equal to the length of glabella, fixed cheeks rudimentary, facial suture rather straight cutting the outer margin nearly at right angles, and the posterior margin rather near to the glabella. The glabella and tail are about equal in length. Eye crescentic. Of the thorax I have only distinguished fragments. In these the sulcus is strongly marked, and terminates short of the extremity.

Pygidium semi-elliptical, about $\frac{3}{4}$ as long as wide, the axis very conspicuous, sides rather perpendicular, top arched or convex, with 7 or 8 rings visible, those towards the extremity indistinct. The 8 rings are only seen in the largest specimens. Side lobes $1\frac{1}{2}$ times as wide as axis at widest part; they are fairly convex on some pygidia, and in others rather flattened (but I think that the convex is the normal character), margin fairly large. Four pleuræ of the pygidium strongly indicated in which the sulcus is wide and shallow.

I give some of the dimensions of one of the specimens figured (fig. 4), which is fairly complete; but unfortunately it has the head turned back on the thorax and almost covering that part.

Glabella long $\frac{24}{96}$ in. (6·35 mm.); pygidium long $\frac{24}{96}$ in. (6·35 mm.), wide $\frac{36}{96}$ in. (9·5 mm.). Another pygidium (fig. 5) has a length of $\frac{30}{96}$ in., and width of $\frac{40}{96}$, so that the proportion of length to width is variable, arising probably from different degrees of compression suffered by the different specimens.

This species is obtained from the lower Trilobite Bed of Bowning, associated with several species of *Phacops*, *Acidaspis*, and a *Cyphaspis*, probably identical with the one described above. One of the first-named is either *P. longicaudatus* or very closely allied to it.

Note.—Since writing the above description I have examined a larger pygidium of the *Bronteus*, and find that the second rib from the medial one is not narrower than the adjoining rib. The compressed state, therefore, of this rib in the specimen described, may be only characteristic of young specimens.

In conclusion I have to express my obligations and thanks to Mr. R Etheridge, F.G.S., who has kindly helped me with suggestions and advice.

EXPLANATION OF PLATE.

Fig. 1.—*Bronteus longispinifex*—Pygidium and 6 segments of thorax (×3).

Fig. 2.— ,, ,, Head and one free cheek. (Nat. size).

Fig. 3.—*Cyphaspis Bowningensis* (×2).

Fig. 4.—*Proetus Bowningensis*—Pygidium and head, the latter turned back on the thorax. (Nat. size.)

Figs. 5 & 6.—*Proetus Bowningensis*—Another head and pygidium. (Nat. size.)